

Network Simulator 3

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Introduction

What is ns3?

- ns-3 is written in C++
- Bindings in Python
- ns-3 uses the waf build system
- simulation programs are C++ executables or python scripts
- API documentation using doxygen

- Waf :
 - Waf is a Python-based framework for configuring, compiling and installing applications in ns3

Getting started

Installation

- `sudo apt update`
- `sudo apt upgrade`
- `sudo apt install build-essential autoconf automake libxmu-dev python-pygoocanvas python-pygraphviz cvs mercurial bzip2 git cmake p7zip-full python-matplotlib python-tk python-dev python-kiwi python-gnome2 python-gnome2-desktop-dev python-rsvg qt4-dev-tools qt4-qmake qt4-default gnuplot-x11 wireshark`
- Download ns3 from <https://www.nsnam.org/>

Installation (contd.)

- `cd ns-allinone-3.29/`
- `./build.py --enable-examples --enable-tests`
- `cd ns-3.29`
- copy inside scratch folder `first.cc` and `second.cc`
- run command : `/waf --run scratch/first`

The fundamental objects

- Node: the motherboard of a computer with RAM, CPU, and, IO interfaces
- Application: a packet generator and consumer which can run on a Node and talk to a set of network stacks
- NetDevice: a network card which can be plugged in an IO interface of a Node
- Channel: a physical connector between a set of NetDevice objects
- Note:
 - NetDevices are strongly bound to Channels of a matching type.

Model Implementations

- Network stacks: ipv4, icmpv4, udp, tcp (ipv6 under review)
- Devices: wifi, csma, point-to-point, and queues
- Applications: udp echo, on/off, sink
- Routing: olsr, static global

The helper API

- The idea is simple:
 - Sets of objects are stored in Containers One operation is encoded in a Helper object and applies on a Container
- Helper operations:
 - Are not generic: different helpers provide different operations
 - Do not try to allow code reuse: just try to minimize the amount of code written
 - Provide syntactical sugar: make the code easier to read

The helper/container API

- Example containers:
 - NodeContainer
 - NetDeviceContainer
 - Ipv4AddressContainer
- Example helper classes:
 - InternetStackHelper
 - WifiHelper
 - MobilityHelper
 - OlsrHelper etc.
- Each model provides a helper class

- <https://www.geeksforgeeks.org/computer-network-network-simulator-3/>
(Please refer to this article for brief introduction)